



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,540	07/22/2003	William S. Kennedy	015290-661	4866

7590 01/25/2007
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, VA 22313-1404

EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
----------	--------------

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/623,540	Applicant(s) KENNEDY ET AL.	
	Examiner Rudy Zervigon	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-14,16-25 and 28-30 is/are pending in the application.
- 4a) Of the above claim(s) 22-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-14,16-21 and 28-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 11, 2006 has been entered.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "131" has been used to designate both "upper portion", and "external threads". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "12" has been used to designate both "second member", and "inner electrode member". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to

Art Unit: 1763

the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "14" has been used to designate both "outer electrode member", "second member". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "18" has been used to designate both "backing member", and "first member". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one

Art Unit: 1763

figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "22" has been used to designate both "backing ring", "first member". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance..

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "24" has been used to designate both "top plate", and "third part". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR

1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1-5, 7-14, 16-21, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes; Michael et al. (US 6,818,096 B2) in view of Ishida; Toshimichi et al. (US 5,766,364 A) and Nishimura, Akira (JP 04316709 A). Barnes teaches a component (Figure 1; column 1, line 55 - column 2, line 58) of a plasma (abstract) processing apparatus, comprising: a first member (1; Figure 1) bonded¹ to a second member (8,2; Figure 1), the first member (1; Figure 1) including a plurality of through apertures (T-shaped hole for 18; Figure 1) having a first portion (top portion of through hole for 18; Figure 1) and a second portion (bottom portion of through hole for 18; Figure 1) wider than the first portion (top portion of through hole for 18; Figure 1) - claim 1

Barnes further teaches:

- i. The component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 1, wherein (i) the first fastener members (22; Figure 1) are T-nuts having a T-shape (as seen in Figure 1) and internal threads, or (ii) the first fastener members (22; Figure 1) comprise a head (top thickest portion of 18; Figure 1) and an externally threaded end portion opposite the

Art Unit: 1763

head (top thickest portion of 18; Figure 1), as claimed by claim 2. It is inherent that Barnes' bolts have "a head and an externally threaded end portion opposite the head".

- ii. The component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 1, wherein the surface that at least partially defines the second portion (bottom portion of through hole for 18; Figure 1) of the aperture (T-shaped hole for 18; Figure 1) is a second bearing surface – claim 3
- iii. first fastener members (22; Figure 1) comprise a rectangular-shaped head (see rectangular shape in Figure 1), as claimed by claim 5
- iv. The component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 1, further comprising: a temperature-controlled (20; Figure 1; column 2, lines 35-58) top plate (7; Figure 1; column 2, lines 35-58) on (on top of) the first member (1; Figure 1) adjacent the first portion (top portion of through hole for 18; Figure 1) of the apertures (T-shaped hole for 18; Figure 1) of the first member (1; Figure 1) and including a plurality of through openings (top portion of T-shaped hole for 18 - not labeled; Figure 1) each aligned with a respective aperture (T-shaped hole for 18; Figure 1) in the first member (1; Figure 1) – claim 4
- v. The component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 4, wherein each of the first fastener members (22; Figure 1) comprises external threads – claim 9. It is inherent that Barnes' "bolts" have "a head and an externally threaded end portion opposite the head". And that Barnes' "bolts" have "first fastener members (22; Figure 1) comprises internal threads, and each of the second fastener members (18; Figure 1)

comprises external threads engaged with the internal threads of a respective first fastener member (22; Figure 1)".

- vi. A showerhead (Figure 1) electrode (7; Figure 1) assembly for a plasma (abstract) processing apparatus (Figure 1), comprising; an electrode (7; Figure 1) having a gas injection opening (5; Figure 1); a backing member (1; Figure 1) secured to the electrode (7), the backing member (1; Figure 1) including a plurality of through apertures (T-shaped hole for 18; Figure 1; column 2, lines 35-58) each having a first portion (bottom portion of through hole for 18; Figure 1; column 2, lines 35-58) and a second portion (top portion of through hole for 18; Figure 1) wider than the first portion (bottom portion of through hole for 18; Figure 1); a top plate (7; Figure 1; column 2, lines 35-58) including a plurality of through openings (top portion of T-shaped hole for 18 - not labeled; Figure 1) each of which is aligned with a respective aperture (T-shaped hole for 18; Figure 1; column 2, lines 35-58) in the backing member (1; Figure 1); second fastener member (18; Figure 1) to secure the backing member (1; Figure 1) to the top plate (7; Figure 1; column 2, lines 35-58) – claim 17
 - i. The component of Claim 11, wherein the third member (7; Figure 1 - Applicant equates his "top plate" with "third member") is a temperature-controlled top plate (7; Figure 1; column 2, lines 35-58), as claimed by claim 28
 - ii. The showerhead electrode assembly of Claim 17, wherein the top plate (8) is on (touching) the backing member (1; Figure 1) adjacent the first portion of the apertures (T-shaped hole for 18; Figure 1; column 2, lines 35-58) of the backing member (1; Figure 1) and temperature-controlled, as claimed by claim 29

Art Unit: 1763

Barnes does not teach:

- i. “non-circular shaped” first fastener members (22; Figure 1) – claim 1
- ii. a plurality of first fastener members (22; Figure 1) each mounted in an aperture (T-shaped hole for 18; Figure 1) of the first member (1; Figure 1) each first fastener member (22; Figure 1) including a head (widest portion of 22; Figure 1) configured to prevent rotation of the first fastener members (22; Figure 1) relative to the first member (1; Figure 1), the head (widest portion of 22; Figure 1) having a bearing surface (lowest surface of widest portion of 22; Figure 1) facing a surface that at least partially defines the second portion (bottom portion of through hole for 22; Figure 1) of the aperture (T-shaped hole for 18; Figure 1) – claim 1
- iii. the bearing surface of each of the first fastener members (22; Figure 1) each include a head (thickest portion of 22; Figure 1) bonded with an elastomer to the surface - claim 3
- iv. a plurality of second fastener members (18; Figure 1) each engaged with a respective first fastener member (22; Figure 1) to secure the first member (1; Figure 1) to the top plate (7; Figure 1; column 2, lines 35-58) - claim 4
- v. The component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 1, wherein the first member (1; Figure 1) comprises a plate made of graphite, and the second member (8,2; Figure 1) comprises a showerhead (top thickest portion of 18; Figure 1) electrode made of silicon, as claimed by claim 7
- vi. The component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 1, wherein the second member (8,2; Figure 1) comprises an inner silicon electrode (2; Figure 1) and a segmented outer silicon electrode (8; Figure 1), and the first member (1; Figure 1)

Art Unit: 1763

- comprises a graphite backing plate (1; Figure 1) secured to the inner silicon electrode (2; Figure 1) and a graphite backing ring (11; Figure 1) secured to the outer silicon electrode (8; Figure 1), as claimed by claim 8
- vii. each of the second fastener members (18; Figure 1) comprises internal threads engaged with the external threads of a respective first fastener member (22; Figure 1) - claim 9
- viii. Barne's component (Figure 1; column 1, line 55 - column 2, line 58) of Barne's plasma processing apparatus (abstract), comprising: Barne's second member (3; Figure 1) including Barne's attachment surface (2/3 interface; Figure 1) and Barne's exposed surface (lowest surface of 3) adapted to be exposed to Barne's interior of Barne's plasma processing chamber (Abstract); Barne's first member (1; Figure 1) including Barne's first surface (Lowest Surface of 1; Figure 1) spaced from Barne's second surface (Top Surface of 1; Figure 1), Barne's first surface (Lowest Surface of 1; Figure 1) being bonded¹ to Barne's attachment surface (2/3 interface; Figure 1) of Barne's second member (3; Figure 1), Barne's first member (1; Figure 1) including axially extending apertures (passages for 4) extending between Barne's first surface (Lowest Surface of 1; Figure 1) and Barne's second surface (Top Surface of 1; Figure 1), each of the apertures (4) including Barne's first portion opening in Barne's first surface (Lowest Surface of 1; Figure 1) and Barne's second portion opening in Barne's second surface (Top Surface of 1; Figure 1), Barne's first portion being wider in Barne's transverse direction than Barne's second portion; and T-nuts having a T-shape located in Barne's second portions (top surface of 4) of Barne's apertures (4), as claimed 10

Art Unit: 1763

- ix. Barne's component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 10, further comprising: Barne's third member (7; Figure 1 - Applicant equates his "top plate" with "third member") adjacent Barne's second surface (Top Surface of 1; Figure 1) of Barne's first member (1; Figure 1) and including through openings aligned with Barne's apertures (4) in Barne's first member (1; Figure 1); and Barne's connectors ("pins/studs" 4) located in Barne's openings (holes in 2 accommodating "pins/studs" 4), Barne's connectors ("pins/studs" 4) being detachably engaged with the T-nuts such that Barne's third member (7; Figure 1 - Applicant equates his "top plate" with "third member") is detachable from Barne's first member (1; Figure 1), as claimed by claim 11
- x. Barne's component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 10, wherein Barne's second member (3; Figure 1) is Barne's showerhead electrode, and Barne's first member (1; Figure 1) is Barne's backing plate, as claimed by claim 12
- xi. Barne's component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 11, wherein Barne's connectors ("pins/studs" 4) include external threads, as claimed by claim 13
- xii. Barne's component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 10, wherein Barne's second portions (top surface of 4) of Barne's apertures (4) comprise at least one load-bearing surface (top surface of "pins/studs" 4) extending in Barne's transverse direction, and the T-nuts comprise at least one surface bonded to Barne's load-bearing surface (top surface of "pins/studs" 4), as claimed by claim 14
- xiii. Barne's component (Figure 1; column 1, line 55 - column 2, line 58) of Claim 11, wherein Barne's first portions of Barne's apertures (4) are round holes having diameters

Art Unit: 1763

larger than diameters of openings (holes in 2 accommodating “pins/studs” 4) in Barne’s third member (7; Figure 1 - Applicant equates his “top plate” with “third member”), as claimed by claim 16

- xiv. a silicon electrode having gas injection openings – claim 17
- xv. a graphite backing member (1; Figure 1) – claim 17
- xvi. a plurality of T-nuts having a T-shape, each T-nut being mounted in a respective aperture (T-shaped hole for 18; Figure 1; column 2, lines 35-58) of the backing member (1; Figure 1), each T-nut including a bearing surface (lowest surface of widest portion of 18; Figure 1) facing a surface at least partially defining the second portion (top portion of through hole for 18; Figure 1) of the apertures (T-shaped hole for 18; Figure 1; column 2, lines 35-58) – claim 17
- xvii. The showerhead electrode assembly of Claim 17, wherein the T-nuts comprise a bearing surface adhesively bonded to the bearing surface of the aperture – claim 18
- xviii. The showerhead electrode assembly of Claim 17, wherein the second portion of each aperture is configured to prevent rotation of the T-nut relative to the backing member (1; Figure 1) – claim 19
- xix. The showerhead electrode assembly of Claim 17, wherein the silicon electrode comprises an inner member and a segmented outer member, and the backing member (1; Figure 1) comprises a backing plate secured to the inner member and a backing ring secured to the outer member – claim 20

Art Unit: 1763

- xx. The showerhead electrode assembly of Claim 17, wherein (i) each of the T-nuts comprises internal threads, and each of the second fastener members comprise external threads engaged with the internal threads of a respective T-nut - claim 21
- iii. second fastener members (18; Figure 1) comprises external threads engaged with the internal threads of a respective T-nuts having a T-shape – claim 21. It is inherent that Barnes’ “bolts” have “a head and an externally threaded end portion opposite the head” and are “second fastener members (18; Figure 1) comprises external threads” – claim 21
- xxi. The showerhead electrode assembly of Claim 17, wherein the backing member (1; Figure 1) comprises a first surface (bottom surface of 1) and a second surface (top surface of 1) opposite the first surface, the first surface (bottom surface of 1) is secured to the silicon electrode (Figure 1) and the second surface (top surface of 1) is secured to the top plate (7; Figure 1; column 2, lines 35-58), as claimed by claim 30

Nishimura teaches a securing means as T-nuts (10; Figure 1) having a T-shape with a first portion (12; Figure 1,4) being wider in transverse direction than a second portion (11; Figure 1,4). Nishimura’s T-nuts having a T-shape (10; Figures 1) each include a head (12; Figure 1).

Ishida teaches a similarly constructed plasma apparatus (Figure 1) and electrode (106; Figure 1, 3-5) including a plurality of first fastener members (109; Figures 3-4) with a first portion (Top of 109) being wider in transverse direction than a second portion (Bottom of 109). Ishida’s first fastener members (109; Figures 3-4) each include a head (top thickest portion of 109; Figure 1) bonded¹ with an elastomer (31a – “O-rings”; Figure 3; column 4, lines 23-28).

¹ Bond verb 3 a : to cause to adhere firmly - <http://www.m-w.com/cgi-bin/dictionary>

Art Unit: 1763

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Nishimura's T-nuts having a T-shape (10; Figure 1) to Barnes' apparatus and construct Barnes' electrode of silicon, having plural gas injection openings, and construct Barnes' backing member (1; Figure 1) of graphite.

Motivation to add Ishida's T-nuts having a T-shape (10; Figure 1) to Barnes' apparatus is for "stably seating" apparatus parts as taught by Nishimura (abstract) and transferring heat among Ishida's component parts to avoid deformation as taught by Ishida (column 2; lines 39-46), further, motivation to construct Barnes' a electrode of silicon, having plural gas injection openings, and construct Barnes' backing member (1; Figure 1) of graphite is for using plasma compliant materials as taught by Barnes (column 1; lines 9-21). Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04). Further, it has been held that it is obvious to make whole elements separable (In re Dulberg, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961) – MPEP 2144.04).

Response to Arguments

10. Applicant's arguments with respect to claims 1-5, 7-14, 16-21, and 28-30 have been considered but are moot in view of the new grounds of rejection.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry

Art Unit: 1763

of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

Parviz Hassanzadeh
1/22/7